

## **SCIENTIFIC INVESTIGATIONS**

Each time you carry out an investigation check the following points.

### **Planning**

- Have I written a short concise introduction?
- Have I stated my aim or objective (research question)? Be precise.
- If it is valid, have I written my hypothesis (a justified prediction)?

### **Method**

- Which variable will I change (the independent variable)?
- Which variable will I measure/observe (dependent variable)?- How will I measure it and how often?
- Which other variables do I need to control (which ones will affect the experiment)?
- How many trials do I need to be sure of my results?
- What equipment and materials will I need?
- What safety factors should I bear in mind?

### **Results/Data**

- How accurate must I be?
- How should I present them? (annotated drawings, tables, prose)
- Where are the errors in my measurements/observations and how big are they likely to be?
- Did I see anything else happen during the investigation that needs to be described?

### **Processing and Analysis of Results**

- Do I leave them as they are?
- Do I calculate a change, a proportion/percentage, an average or other statistical value?
- Do I present them as a table or graphically?
- If graphically, what sort of graph is best? What are the conventions?
- Do I need to analyse the graph to obtain a result?

### **Discussion of results**

- What do the results show? (Are there any trends?)
- What can I interpret from the results? (Explain them in a systematic way.)
- Are the results consistent with what I expected?
- Can I explain any unexpected results?
- Compare with literature values where appropriate
- What are the sources of error: in my method, in the manipulation, in the analysis?
- What improvements could be made?
- Do I need to suggest a new hypothesis to account for the results?
- How could I take the investigation further?

### **Style**

- Keep it impersonal (eg "The tubes were left for 10 minutes to incubate" instead of "I left the tubes for 10 minutes to incubate")
- Use labelled or annotated diagrams, if necessary, to show the experimental set up.
- Use subheadings to organise your report (Aim, Hypothesis, Method, Results etc)